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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,552	05/10/2002	Ayodhya Nath Tiwari	009765-031	8765
21839	7590	03/10/2004	EXAMINER	
BURNS DOANE SWECKER & MATHIS L L P			MULPURI, SAVITRI	
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ALEXANDRIA, VA 22313-1404			PAPER NUMBER	

2812

DATE MAILED: 03/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/030,552

Applicant(s)

TIWARI ET AL.

Examiner

Savitri Mulpuri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori Koshiro (JP 63107073) or Kishi Yasuo (JP 01105581) in combination with Deutscher et al (4,255,208).

Koshiro and Yasuo teach forming flexible solar substrate by forming device layers on the resin layer "2" coated substrate "1"; producing flexible solar cell with resin layer "2" as support layer; separating the substrate from the resin layer having solar cell for example by dipping in hot water in the invention of Koshiro. However none of the references teach forming intermediate layer of sodium chloride or sodium fluoride and separating the flexible solar cell by dissolving sodium chloride intermediate layer and reusing the substrate.

Deutscher et al teaches forming sodium chloride layer on a substrate of silicon or sapphire substrate; coating the substrate with water dissolvable sodium chloride and forming solar cell device layers and separating substrate from the solar cell formed of silicon or germanium by dissolving the sodium chloride intermediate layer and reusing the substrate (see abstract and all examples). It would have been obvious to one of

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ordinary skill in the art to use water dissolvable intermediate layer between substrate and resin layer in the invention of both Koshiro or Yasuo so that sodium chloride layer can be dissolved by using water with out effecting either resin layer or the substrate quality and reusing the substrate for the forming solar cells on the same substrate.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable Basol et al in combination with Deutscher et al (4,255,208).

Basol teaches forming flexible copper indium selenide (CIS) solar cells for wide range of applications for both space and terrestrial applications: successively forming Mo layer, light absorbing CIS layer, light window layer CdS/ZnO layer and ohmic contacts directly on polyimide (KAPTON<sup>TM</sup>) substrate (see abstract, fig.1 table 1 substrate thickness (50 microns). Basol et al does not teach forming resin layer and subsequent formation of solar cell on a substrate coated with water dissolvable sodium chloride.

Deutscher et al teaches forming sodium chloride layer on a substrate of silicon or sapphire substrate; coating the substrate with water dissolvable sodium chloride and forming solar cell device layers and separating substrate from the solar cell formed of silicon or germanium by dissolving the sodium chloride intermediate layer and reusing the substrate (see abstract and all examples). It would have been obvious to one of ordinary skill in the art to form thin resin layer on a substrate coated with water dissolvable intermediate layer in the invention of Basol et al as an alternative to formation of solar cell directly on resin substrate having thickness of 50 microns, so that final solar cell would formed on very thin flexible resin layer and such solar cells formed

on thin resin layer is very flexible and would be applied in several areas such narrow or curved surfaces for electric power generation. The use of thick and temporary substrate coated with sodium chloride would permit the use of thin resin layer and would eventually produce ultra-thin solar cells. Modified invention of Basol would have advantage of separating and reusing the substrate repeatedly.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Landis teaches forming calcium fluoride as a sacrificial layer over the substrate and dissolving the calcium fluoride and reusing the single crystalline silicon to form ultra-thin light trapping solar cells. (see, title, abstract and pager 265), but do not teach flexible substrate.

Gmitter, Morikawa, Hokuyou, Nuyen teaches removing the substrate for forming solar cells. Bhattacharay teaches CIS, CIGS solar cells. Prior art listed in the PCT application was reviewed

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Savitri Mulpuri whose telephone number is 571-272-1677. The examiner can normally be reached on Monday to Friday 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 571-272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Savitri Mulpuri  
Primary Examiner  
Art Unit 2812